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Ronald Bishop SMITH

A COMPARATIVE STUDY OF 16th CENTURY PORTUGUESE AND EAST MEDITERRANEAN ARTILLERY

I began these small and insignificant works on cannons as an extension of my work of many years in the Torre do Tombo in Lisbon on 16th century Portuguese figures of the discoveries. Knowing how to read 16th century Portuguese texts in letters of that time, and seeing the same writing and symbols on Portuguese cannons of the same epoch, allowed me to make some identifications which had not been made before. A comparative study, when it can be made, is always best: having received photographs in unexpected ways, and sometimes asking for them, made it possible for me to compare some 16th century cannons of Eastern Mediterranean origin, mostly swivel-guns, with Portuguese cannons of the same type. It is not well known but most existing 16th century bronze swivel-guns are of Portuguese or Eastern Mediterranean origin. I have put a lot of effort in this type of comparative study in the last 3 or 4 years.

I.
TWO FRANCISCOS. A CONTRIBUTION TO THE HISTORY OF 16th CENTURY PORTUGUESE ARTILLERY

In the Museu Militar of Lisbon there are two 16th century bronze artillery pieces on public display bearing the identification marks B.6 and C.3. Each piece contains the same cipher standing for the name of the founder who made it. The cipher (which in no wise is of difficult reading) has not been identified by specialists interested in Portuguese artillery from the time of João Manuel Cordeiro's *Apontamentos para a Historia da Artilheria portugueza*, Lisbon, 1895 —or subsequently in the ten editions of the catalogue of the museum's collections[1], in the catalogue devoted to the museum's artillery collection[2]— or by investigators such as Henrique Pereira do Valle[3] and Nuno Valdez dos Santos[4].

1) Beginning with the *Catalogo das Collecções do Museu de Artilheria. Reorganisado em 1897*, Lisbon, 1897, and continuing with the 2nd edition (1901), and later editions of the catalogue. (I have seen all the editions of the catalogue except the 8th, of which I can not find a copy in Lisbon. To judge from the 7th and 9th editions, however, its contents would not affect what we have to say below). In both João Manuel Cordeiro's *Apontamentos para a Historia da Artilheria Portugueza* (pp. 64, 70) and in the 1st, 2nd and 3rd editions of the catalogue (p. 88 of the 1st, p. 100 of the 2nd and pp. 91, 92 of the 3rd edition) there are stylized representations of the cipher for what later came to be numbered B.6 and C.3 in the museum collections. For B.6 the representation is entirely wrong, being rendered in a meaningless *LR* form. For C.3 it has been rendered reasonably accurately. Not until the 10th and final edition of the catalogue, *Catálogo do Museu Militar (Antigo Museu da Artilharia)*, Lisbon, 1930, do we finally have a stylized representation, given reasonably accurately, which is applicable as the catalogue indicates (pp. 44, 45), for both B.6 and C.3. The Museu Militar has not, I believe, published a photograph of the cipher.

2) *Museu Militar. Guia da Artilharia Histórica*, Lisbon, 1979.

3) In his "Marcas de Fundidores Portugueses de Artilharia do Século XVI", *Revista de Artilharia*, Ano LIX, 2. Série, Nos 451-452, Lisbon, 1963, pp. 423-433.

4) In his *A Artilharia Naval e os Canhões do Galeao «Santiago»*, Lisbon, 1986, p. 50 where he wrongly identifies the letters of the cipher as *CFR* and "a little 'o' inside" *(e um pequeno «o» incluso)*. These are certainly the letters but the sequence is wrong. Nautical archeologists, who have been finding cannon with this cipher in various underwater locations from South Africa to Japan, and even in a garage in the Seychelles, have misled Valdez dos Santos. They have invented the *CFRO* monogram without being able to explain what it means (cf., for example, *São Bento* and *Seychelles*). In the cited work of Valdez dos Santos (at p. 51) there is a photograph of this cipher on a cannon recovered in the Mozambique Channel and which is presently in the Museu de Marinha of Lisbon, having been purchased for its collections in the mid 1980s, but which is still not on display. In the cited *Annals of the Natal Museum*, p. 7 (cf. *São Bento*), there is another photograph of the cipher from one of the many cannon which have been recovered off the coasts of South Africa which bear this mark. As I stated I know of no published photograph of this cipher from the Museu Militar's collection.

The cipher stands for Francisco.

Valdez dos Santos in his *A representação das Armas Nacionais nas Peças de Artilharia*, Lisbon, 1991 (work without pagination), footnote 34 (I am indebted to the author for bringing this work to my attention and for furnishing me with a photocopy of it) has recently given the letters of the cipher in proper sequence as *FRCo*[5] (*FRC°* is the correct rendering indicating an abbreviation) without stating what the letters mean. They stand for Francisco, in identification for piece C.3 which I made on the basis of paleography in my *Fernão Peres de Andrade*, Lisbon, 1981, p. 28, and who I identified as the founder Francisco Alvares who was active in Lisbon in the middle of the 16th century and who I sought to identify on the basis of Sousa Viterbo's study[6].

Also in the Museu Militar of Lisbon there is a 16th century iron artillery piece on display with the identification mark R.23. It contains an abbreviation (or rather two abreviations) for the name of the constructor (not founder since the piece is made out of forged iron) who made it, who has been wrongly identified as Fernando Anes by investigators, among whom Sousa Viterbo[7].

The constructor's name is Francisco Anes.

The piece C.3 bears an inscription giving the date of construction as 1550. With its companion piece C.2 (both are found in the museum's Sala Vasco da Gama), which bears the date 1549 (and an abbreviation for João Dias, the founder who made it), they are the oldest artillery pieces made in Portugal found in the Museu Militar today which contain both the year of manufacture of the piece and an indication of the name of the founder[8].

The reason why these artillery pieces have not been properly identified for so long a time, is due to the lack of paleographic knowledge of those interested in Portuguese artillery, above all by the proper staff of the Museu Militar. In this brief work I take the opportunity of noting this fact, and rectifying the oversight for the pieces B.6, C.3 and R.23.

II.
DIOGO PIRES.
A CONTRIBUTION TO THE HISTORY OF 16th CENTURY PORTUGUESE ARTILLERY

In the Museu Militar of Lisbon there are three bronze 16th century Portuguese artillery pieces on public display which bear the identification marks B.2, B.3 and B.9[9]. Each piece bears the arms of Portugal, the well-known armillary sphere and superficially what appears to be a different cipher standing for the name of the founder who made it. As these artillery pieces have in no wise been carefully studied, it is not suspected today that they were founded by the same founder[10].

The founder is Diogo Pires. We shall see why.

B.9 is a small breech-loader, commonly called in English a swivel-gun (in Portuguese a *berço*). The cipher, standing for the name of the founder, appears in a vertical cartouche of two letters, and bottom up the letters read *CO* (as capital letters)[11]. B.3 is a fairly large muzzle-loader. This cipher appears in the same form of a vertical cartouche of two letters, and bottom up the letters read *DO* (the *'d'* as a small letter the *'O'* as a capital). B. 2 is also a muzzle-loader, of about the same size as B.3. The cipher is a large capital letter *D*[12].

5) *A Representação das Armas Nacionais nas Peças de Artilharia*, Lisbon, 1991 (work without pagination), footnote 34.

6) "Fundidores de Artilheria", *Revista Militar*, Tomo LIII, Lisbon, 1901, pp. 104-106.

7) Cf. Sousa Viterbo, "Fundidores de Artilheria", *Revista Militar*, Tomo LIII, Lisbon, 1901, p. 141, and more recently *Bocas de fogo*, p. 42 and Nuno Valdez dos Santos, "O Canhão de Banastarim", *Independência*, Ano I, 2ª. Série, N° 2, Lisbon, 1980, p. 64, or even as Fernandes Anes by the same Pereira do Valle, "Ecos da India ; desfazendo uma lenda, a peça de Banastarim ; espalhafatos e roquerias", *Revista de Artilharia*, Ano LX, 2ª. Série, nºs 459-460, Lisbon, 1963, p. 212 and by the same Valdez dos Santos, "Identificação das peças portuguesas dos séculos XVI e XVII", *Revista de Artilharia*, Ano LXXVIII, 2ª. Série, nºs 681-682, Lisbon, 1982, p. 317. The piece in question contains an inscription referring to the constructor who made it *FRCO AÑS MEFEZ* (with letter *C* inverted) meaning : *FRANCISCO ANES ME FEZ* (in English : FRANCISCO ANES MADE ME).

8) There is an older bronze artillery piece made in Portugal dated 1545, and bearing the cipher for João Dias, in the Museu de Angra do Heroísmo in the Azores (cf. Baptista de Lima's "Uma notável peça de artilharia portuguesa do Século XVI", *Boletim do Instituto Histórico da Ilha Terceira*, Vol. XXVII-XXVIII (1969-1970), Angra do Heroísmo, 1978, pp. 520-532). The pieces B.6 and R.23 do not bear statement of the year when they were made.

9) They are found in the museum's Sala Vasco da Gama and can be easily inspected.

10) In the catalogue of the museum's artillery collection, *Museu Militar*, which describes these pieces, Sebastião Cobris is mentioned as a possible founder of B. 9. This supposition (and that is what it is) derives ultimately from Herique Pereira do Valle and is found in his *Marcas*, pp. 423-433 at p. 425 where it is entered as law. He is frequently cited as authority by nautical archaeologists for what has come to be known as the *CO* or *OC* monogram which, as we shall see below, is really that of Diogo Pires. His assertion (his dictum) that *CO* on B.9 stands for Cobris has helped to deceive an entire generation of nautical archaeologists, who have been finding cannon with this monogram, as to the real meaning of the monogram (cf. to this respect *São Bento* and *Seychelles* where they accept his interpretation of it without challenge). The catalogue moreover indicates that B.2 and B.3 were founded by different founders. However it does not indicate by whom. It wrongly notes that a letter *S* on B.3 indicates the name of the founder. There is no letter *S* on this piece.

11) A photograph of the cartouche, the arms of Portugal and the armillary sphere on B.9 can be seen in *Bocas de fogo*, p. 425.

The representation of the armillary sphere on each of these pieces is the same (sensibly the same but not in all respects equal) which indicates that these pieces, B.2, B.3 and B.9, came from the same founder's office[13].

In the Museu Militar of Lisbon there is also a large bronze 16th century Portuguese muzzle-loader on public display which bears the identification mark R.24[14]. The cipher, standing for the name of the founder, appears in a stubbled *'L'* shaped cartouche of five letters (plus a til indicating abbreviation)[15]. Bottom up the letters read *DO* (the *'d'* as a small letter the *'O'* as a capital) and left to right *PYZ* (the three letters as capitals, the *'Z'* reversed and the til over the *'P'* and *'Y'*).

This is an abbreviation for Diogo Pires[16].

The format of the representation of the letters *DO* in R.24 is the same as that of the letters in B.3, and save for the fact that the letter *'d'* (small *'d'*) is inverted giving the appearance of *'C'* (capital *'C*) the format of the representation of the letters is the same in B.9, which indicates that these pieces, B.3, B.9 and R.24, came from the same founder's office[17].

In B.9, standing at the butt of the piece and looking towards the muzzle, the letters of the cipher read bottom up *CO* but standing at the muzzle and looking at this gun towards the butt, the letters read top down *DO* and standing at the right side of the piece, and looking at the letters parallel to the butt and muzzle, they also read *DO*. The letters on the ciphers of B.3, B.9 and R.24 are all from the same founder's moulds and are stylistically the same. They identify, and would be taken to identify during the founder's lifetime, the founder whose name is abbreviated in the cipher of R.24. That founder, as we have seen, is Diogo Pires.

Various sized Portuguese artillery pieces have been recovered from underwater locations with the *CO* or *OC* cipher[18], and it is not presently suspected, either in Portugal or abroad, that this cipher seen from other angles is also *DO*, indicating an abbreviation for Diogo, who, as we have seen, is Diogo Pires[19]. He is the founder of the artillery pieces B.2, B.3, B.9 and R.24 of the Museu Militar of Lisbon, as well as a number of artillery pieces that have been recovered from the sea, and no doubt will be recovered from the sea or found in other places.

III.
A 16th CENTURY PORTUGUESE SWIVEL GUN IN THE BRITISH MUSEUM

Thanks to the courtesy of Robert D. Smith, Head of Conservation at the Royal Armouries, I possess photographs of a small 16th century Portuguese bronze breech-loading swivel-gun, of archaic aspect, and a copy of his article entitled "A 16th century Portuguese bronze breech-loading swivel gun" in which he describes it. He informs me that this article has been submitted to an international association of arms' museums in 1993 for publication but that it is still not published. The cannon, which bears the arms of Portugal, the well-known armillary sphere and a cipher standing for the name of the founder who made it, is described in detail by Robert D. Smith. However the cipher has not been read, nor has the founder been identified.

The cipher is not found among the numerous cannon of the Museu Militar of Lisbon. I know of no other example of it. It appears in a rectangular, nearly square shaped cartouche. (See Photograph 4).

As the cannon is Portuguese the order of the letters is to be read first bottom across *FR* and then top across *CO*. This gives *FRCO* for the cipher. This is the only order in the present instance which gives the cipher any meaning in the Portuguese language. It is an abbreviation for Francisco.

Let's look at the matter a little more closely.

The letters *F*, *C* and *O* are moulded as Roman capital letters. By mistake the *R* was moulded upside down. It is also a Gothic capital letter. Gothic letters are frequently found on 16th century Portuguese inscriptions, such as gravestones, and they are of very common occurrence in this country until 1530. After 1530 they

12) A representation of it can be seen in *Bocas de fogo*, p. 426.

13) The arms of Portugal are likewise the same (sensibly the same) on B.3 and B.9. On B.2 they are slightly different.

14) It is found in the Cave and can be easily inspected.

15) There is a representation of this cartouche in *Bocas de fogo, loc. cit.*

16) This identification has already been made in *Bocas de fogo, loc. cit.*

17) By comparing it with R.24, Pereira do Valle (*Bocas de fogo, loc. cit.*) has already noted that B.3 was founded by Diogo Pires.

18) Cf. *São Bento*, pp. 4-6, and *Seychelles*, pp. 8-10 and 13.

19) The *CO* cipher may very well have some additional significance not presently known, upon which speculation might run, but perhaps not very fruitfully at present, due to lack of elements. In a document of the Torre do Tombo (a *mandado* of the Corpo Cronológico, Parte 2. Maço 208 Documento 65) Diogo Pires' signature appears in an acknowledgement of receipt of material needed for the making of a *leão* (dated August 29, 1536) in a design associated with his name that contains symbols very similar to the *CO* cipher as seen from the right side of a cannon (butt to muzzle) with this monogram on it.

become progressively harder to find. By 1550 they have virtually disappeared from the Portuguese scene. This would appear to indicate that the cannon was founded sometime near the middle of this period: say about 1540.

The cipher which appears on the British Museum piece is merely an earlier version of the Francisco shield monogram that I identified *supra*, § I, as belonging to Francisco Alvares.

Is it? I believe so. Let's see why.

The only known dated cannon that bears the Francisco shield version of his monogram is C.3 of the Museu Militar of Lisbon. It is dated 1550. On November 3, 1547 Francisco Alvares, founder of artillery, was awarded by King João III an annual *tença* of 8,000 reis vacated by reason of the death of João Alvares, his father, also founder of artillery[20]. Now it seems to me, on the basis of these indications, that the great number of cannon that have been found which bear the shield version of Francisco Alvares' monogram belong to the post-1547 period of his life[21], when he was already an accomplished founder, and that the British Museum rectangular form belongs to the pre-1547 period. The shield version of the monogram is almost a coat of arms in aspect while the rectangular version is quite simple. This, I believe, indicates that it was used in an earlier period of his life when Francisco Alvares was content with this more modest mark of his workmanship.

According to information furnished to me by Dr. David R. M. Gaimster, Assistant Keeper, Department of Medieval and Later Antiquities, at the British Museum, this swivel-gun was recovered from in front of the *Oba*'s Palace in Benin City (in modern Nigeria) as a result of the British expedition of 1897 and was given to the British Museum by Sir Ralph Moor in 1899. Its identification mark, Dr. Gaimster informs me, is BM Ethno 1899, 6-10, 1.

IV.
AN EARLY 16th CENTURY WROUGHT IRON CANNON IN GOA

Thanks to the kindness of Rainer Daehnhardt, President of the Portuguese Academy of Antique Arms, I possess photographs of a large early 16th century Portuguese wrought iron cannon found in Goa, at Pangim. Mr. Daehnhardt has inspected the piece *in situ*. The cannon is constructed of iron bars and iron rings to which is added a novel bronze center ring and bronze trunnions. The cannon is a rare and notable piece (not the least reason being on account of its great size). It is not, however, unknown in Lisbon. Henrique Pereira do Valle[22] and Nuno Valdez dos Santos[23] have described it. Pereira do Valle has published two black and white photographs of it. One of his photographs is an overall view. The other is a photograph of the markings. This last, however, is so badly published that very little can be seen. Also Pereira do Valle states that in his photograph the date 1515 appears in the upper left hand corner. No date can be seen on his photograph. Mr. Daehnhardt informs me that there is no date on this cannon[24].

As the cannon is little known outside of Goa I take this opportunity to publish four of Mr. Daehnhardt's photographs, to identify all the markings and to date it approximately.

Not much needs to be said about the markings (see Photograph 8). The words are easy to read. Left to right the first is an abbreviation for Jesus, Our Lord, and the second the name of Maria, his mother. The symbols present no problems. Left to right they are the cross of the Ordem de Cristo, the arms of Portugal, the armillary sphere of King Manuel (used however frequently by later kings on Portuguese cannons and other objects) and an elephant (a symbol used to indicate that the cannon was made in India, above all, in the present context, as we shall see, in Cochin). The arms, the armillary sphere and the elephant (and a flower motif) are very similar to the same symbols (and motif) found on the bronze center ring of R.23 of the Museu Militar of Lisbon[25]. The form of the lettering on the center rings of these two cannons is absolutely the same. On R. 23 the constructor's name is given as Francisco Anes[26].

With respect to the origin and date of the Goa cannon Mr. Daehnhardt (as he has informed me personally) subscribes to an old belief that it was originally

20) Sousa Viterbo, *op. cit.*, p. 104-105).

21) I have drawn up a list of 26 different cannon with the distinctive shield version of his monogram (possessing it in whole or in part or suspected to have possessed it) which I hope to submit to the Ordnance Society in Norwich, England for publication in their *Newsletter*. No doubt many more exist which are unknown to me.

22) *Op. cit.* at footnote 7, pp. 207-212.

23) "O Canhão de Banastarim", *op. cit.*, pp. 62-67.

24) Pereira do Valle has misread an abbreviation for Jesus (which appears in Photograph 4). Valdez dos Santos, slavishly following Pereira do Valle's reading, also dates the cannon 1515.

25) R.23 does not, however, possess the cross of the Ordem de Cristo.

26) Upon the correct reading of the name of the constructor of R.23 (Francisco Anes and not Fernando Anes as has been read by so many) cf. *supra*, § I.

made by the Mohammedans of India before the conquest of Goa by Afonso de Albuquerque in 1510. He believes that it was captured about this time and remade by the Portuguese shortly afterwards, with the bronze center ring and trunnions that it now possesses. He refers to it as "A peça de Idal Cão". There has long been the tradition in Goa that the cannon was originally a Mohammedan cannon. Pereira do Valle and Valdez dos Santos (in their cited works) seek to demolish that tradition, in my opinion, without sufficient proof.

The cannon was not made, I believe, by the Portuguese in India when Afonso de Albuquerque governed in India (1509-1515). I have searched diligently in the Torre do Tombo in the Corpo Cronológico, especially in the 2ª. Parte, and I have not found any evidence that Portuguese in India were making either iron or bronze muzzle-loading cannon in the time of Afonso de Albuquerque. However in an unpublished letter of João de la Camara to King Manuel, dated Cochin, December 24th 1518 (Corpo Cronológico, Parte 1ª. Maço 23 Documento 147) I have found that a small *camello* of iron has recently been made in India and that the *mestre* who made it (undoubtedly Francisco Anes) has so much work to do that he has not had time to make other pieces of artillery. Shortly afterwards, in a letter of Nuno de Castro to King Manuel, dated Cochin, the last day of October of 1520 (Corpo Cronológico, Parte 1ª. Maço 9 Documento 92) it is noted that Francisco Anes has recently made in Cochin, by hammering, every fifteen days, six or seven large iron cannons[27].

It appears that production of large Portuguese iron cannon in India is beginning, and only beginning in 1520.

For the above reasons, added also to what appears to be certain stylistic similarities that exist between the Goa cannon and R.23 of the Museu Militar (which I have inspected with Mr. Daehnhardt's photographs in hand) I believe that both cannons were made in Cochin during the 1520s. As the Goa cannon is considerably longer and also larger than R.23 (but not as stout around the middle) it may be that numbers of hands intervened in its construction. Perhaps for this reason the name of Francisco Anes does not appear on it. Perhaps he is dead. Speculation might suggest other reasons as well.

V.
TWO 16th CENTURY VENETIAN CANNON IN THE TURKISH NAVAL MUSEUM[28]

Thanks to the courtesy of Dr. İskender Pala (Doç. Dr. Öğr. Bnb. Deniz Müzesi Komutanı V.) I possess photographs of several interesting cannon of the Turkish Naval Museum in Istanbul and also a listing in Turkish of the museum's 16th century cannon. Two of the museum's Venetian cannon, I believe, are of particular moment for the study of early artillery. One of these is a type of cannon of which only a few exemplars are known to exist in artillery circles today (see Photograph 9). It is a Venetian bronze breech-loading swivel-gun, but with the peculiarity of possessing two distinct parts: a bronze barrel and, as is clearly revealed in the photograph, a damaged wrought iron chamber-holder, with its tiller still in place[29]. Despite the numerous examples of 16th century Portuguese bronze swivel-guns known to exist, none of this nature has come to light[30]. In fact of this kind only one example is known in a fully datable context, that which was found in the Spanish Armada wreck of *La Trinidad Valencera* of 1588[31]. Our piece, of those which I have seen illus-

27) Cf. the published text of this letter in *Cartas de Afonso de Albuquerque*, Tomo VII, Lisbon, 1935, especially at p. 184. I have found many elements on Francisco Anes in the Torre do Tombo which indicate that he was the foremost Portuguese blacksmith in India during the first quarter of the 16th century. Between 1513 and 1525 I find him exercising his office in Cochin (and only in Cochin). After 1525 I have not found traces of him.

28) In preparing this work I have received much valuable assistance from Thom Richardson, Keeper at the Royal Armouries, in Leeds. Without his listing of Venetian cannon in the Askeri Müze I should not have attempted it. I have also received assistance from Prof. Giandomenico Romanelli, Director at the Civici Musei Veneziani d'Arte e di Storia on the identification and meaning of the *X* mark which appears on many Venetian cannon and from Ammiraglio di Divisione (r.) Lorenzo Sferra at the Museo Storico Navale in Venice with respect to two 16th/17th century bronze barrel/iron breech-loaders in the Museo Storico Navale, that were found in the sea near Venice, and also with respect to Alberghetti cannon in his museum. To Anica Kisić, Curator, Pomorski Muzej (Maritime Museum), Dubrovnik, in Croatia, I am especially indebted for information concerning the Gnalić wreck and to Winifred Glover, Curator of Ethnography, at the Ulster Museum, Belfast, and Kenneth Bolton, President of the Teignmouth Museum and Historical Society, on sundry matters. Last but not least I wish to thank Isabel Martins and Irene Quinas at the British Institute in Lisbon for helping me to secure books and articles, in a service well-conducted, which others have since damaged.

29) Its number of inventory is 358. It is described in the list which Dr. Pala sent to me as *16 yy. Venedik yapımı kuyruktan dolma tunç kaval top* (16th century Venetian made bronze barrel breech-loading cannon).

30) And more 16th century Portuguese bronze swivel-guns exist today, and are known to exist, than for any other European country.

31) See Colin Martin and Geoffrey Parker, *The Spanish Armada*, London, 1988, p. 220. The swivel-gun described and illustrated in this place was found complete off the north Irish coast with chamber, swivel mounting, tiller and wedge, including its attached chain, all of these of wrought iron, and other accessories, ready for action, with a stone shot in the barrel and a charge in the breech. A good black

trated, resembles a little more closely the three virtually equal Venetian swivel-guns recovered from the sea at Church Rocks, in front of Teignmouth, Devon, between 1977 and 1982[32], and less so the two virtually equal Venetian swivel-guns of this type recovered from the sea in the Adriatic, in 1967-68[33]. These cannon are not widely known. Nor is the Istanbul swivel-gun.

It is curious to note that in our photograph of this cannon there appears to be a type of cannon such as the principal of the photograph, but lacking its chamber-holder[34]. Quite a few pieces such as this "pipe" can be seen today.

The second cannon (see Photographs 10 and 11) is also Venetian. The winged lion of St. Mark, which appears on this piece, with the open book of his Gospel, and the X mark, which alludes to the Council of Ten (see Photograph 11), clearly indicate the Venetian origin of this cannon[35]. The letter F (Photograph 3) is a founder's mark and stands for a first name. I am not in a position to say what it is[36]. The cannon was probably made by one of the Alberghetti, founders who not only were active and prominent in Venice during the 16th century, but also during the 17th and 18th centuries[37]. It is tempting to identify this piece as the work of Fabio Alberghetti[38]. I believe (at least for now) that its marks are unique.

I believe the photographs that I publish in this place, and the brief notes that I join to them, although not very well developed, will not be unwelcome to those interested in 16th and 17th century artillery, because examples of Venetian artillery in Istanbul are little known in the West.

VI.
THREE SWIVEL GUNS IN THE TURKISH MILITARY MUSEUM[39]

Thanks to the courtesy of Colonel Şevket Keskin (P. Kd. Alb. As. Müze ve Kült. Sit. K.) I possess photographs of three little known swivel-guns of the Turkish Military Museum in Istanbul. These pieces lack writing or insignia. Who made them, and the country of their origin, is still unknown. For these reasons Colonel Keskin informs me they are grouped in the Turkish Military Museum under a heading of "nationality not known".

The first of the swivel-guns (Photograph 12) is perhaps the most notable[40]. It is a large wrought iron piece virtually unknown in the West today. It is Oriental in aspect, formerly of a kind, I believe, used to besiege and to defend forts[41]. I know of no existing cannon like it.

and white photograph of this notable piece can be seen in Niall Fallon, *The Armada in Ireland*, London, 1978, p. 132 and a beautiful color photograph in Laurence Flanagan, *Ireland's Armada Legacy*, Gloucester, 1988, opposite p. 66. Upon the circumstances of its recovery in 1971 (also with a description of it, and how a cannon of this type is made) see Colin Martin, *Full Fathom Five. Wrecks of the Spanish Armada*, London, 1975, pp. 189 sq. (especially pp. 220-222).

32) These swivel-guns are described in an office produced text of the Teignmouth Museum and Historical Society entitled *The 16th Century Bronze Guns of Teignmouth*, 1992, pp. 12-17. They were found nearly complete. The Church Rocks wreck, according to this report, may well be that of a small Venetian ship of the Spanish Armada. If not then (according to the report) a Venetian merchant ship wrecked not long before 1588. A good illustration of the swivel-gun in the Teignmouth Museum can be seen in C. Preece and S. Burton's "Church Rocks, 1975-83: a reassessment", *The International Journal of Nautical Archæology*, Vol. 22, No. 3, London, 1993, pp. 257-265, Figure 14. Of these three swivel-guns one is in the Teignmouth Museum (as noted), another is in the Royal Armouries and another is in private hands whose whereabouts is presently unknown to me.

33) Described and illustrated in "Brod kod Gnalica" in *Vrulje*, Vol. I, Year I, Zadar, 1970. Both swivel-guns are in the Museum of Biograd, Biograd na Moru, Croatia.

34) Its number of inventory is 1908.

35) Its number of inventory is 3962.

36) These markings are not found on 45 different Venetian cannons found in the Turkish Military Muscum and which are described in an office produced text by Thom Richardson in his "Venetian Cannon in the Askeri Müze, Istanbul", *Newsletter* of the Ordnance Society, n° 1 (November 1987).

37) See to this respect Enzio Malatesta, *Armi ed Armaioli*, Milan, 1939, pp. 16-21 and A. N. Kennard, *Gunfounding and Gunfounders*, London, 1986, pp. 28-31.

38) On the basis of Enzio Malatesta, *op. cit.*, p. 18 and A. N. Kennard, *op. cit.*, p. 29.

39) In preparing this work I am particularly indebted to Pedro Malheiro and to the Turkish Embassy in London for helping me to translate from Turkish letters that I have received from the Turkish Military Museum. Pedro Malheiro has also kindly brought to my attention many works on Ottoman and related subjects, and in some cases has furnished them to me from his library, which has helped me to better understand the Ottoman background of these pieces. On whether these cannons are of Western or Oriental origin I wish to thank Howard L. Blackmore for his opinion on the Goa cannon (most meaningful to me) and to C. T. Henry, Curator, at the Royal Armouries, Fort Nelson, for his opinion on the Turkish Military Museum pieces.

40) Its number of inventory is 353.

41) A Turkish breech-loader in a painting in the *Nüzhet*^{ü} *l-esrâr*^{i} *l-aḫbâr der-sefer-i Sigetvâr* of Aḥmed Ferîdûn Paşa (representing the Siege of Szigetvár, 1566), in Esin Atıl, *The Age of Sultan Süleyman the Magnificent*, Washington and New York, 1987, p. 93 (at the top at the page), and two Mughul breech-loaders in a painting of the *Akbar Nāma* (representing the Siege of Chitor, 1567-68), in Geeti Sen, *Paintings from the Akbar Nama*, Calcutta, 1984, Plate 49, suggest how a swivel-gun of this kind may have been used. (A painting of the *Ak-*

The second is a bronze piece with its wrought iron tiller still in place (Photograph 13)[42]. It possesses a blank shield in relief (Photograph 14). This shield Colonel Keskin informs me bears a similarity to shields on certain Ottoman weapons.

In its general aspect this swivel-gun is very similar to two virtually equal bronze Venetian swivel-guns that were found in the sea in the Aegean, near the island of Simi, during the last century[43]. Today they are in the Artillery Museum, at the Rotunda, in Woolwich, England[44].

It also bears a similarity to a curious bronze swivel-gun in the Hellenic Maritime Museum in Piraeus, Greece[45], and to a number of other bronze swivel-guns of Mediterranean origin[46].

It appears to me to be of Western origin.

The third is also a bronze piece (Photograph 15)[47]. It is the oldest of the two bronze swivel-guns. It is Oriental in aspect[48].

These three swivel-guns of the Turkish Military Museum were all, I believe, made during the 16th century.

Colonel Keskin has not been able to furnish me with information, apart from some well-meaning generalizations and speculations, upon where these swivel-guns were found before they entered the Turkish Military Museum[49]. Whether a thorough knowledge of museum records, or other sources, might be able to throw some light on this matter is not given for me to know, at least for now.

As these swivel-guns of the Turkish Military Museum are little known in the West, and as their nationality is unknown in Istanbul, I believe the photographs published in this work will make them better known, and possibly, some day, assist others, more competent than myself in this material, in unravelling some of

bar Nāma in Geeti Sen, *op. cit.*, Plate 54, representing the Siege of Ranthambhor, 1569, in which at least two Mughul cannons on top of a *sabat* are similar to this piece, is also instructive to this respect). The use of the term "swivel-gun" for a cannon of this size is perhaps only justifiable by analogy. The referred Turkish breech-loader is shown firing from a two-wheel carriage.

42) Its number of inventory is 421.

43) See John Hewitt's "Venetian bronze guns recovered by divers in the Mediterranean", *The Archæological Journal*, Vol. XXVIII, London, 1871, pp. 305-308. One of the swivel-guns is illustrated.

44) Class II, Nos. 252 and 253.

45) To judge from a photograph which the Direction of the Hellenic Maritime Museum (in the persons of the Secretary General, Nikolaos Lahanos, and the Chairman, Constantin Paizis-Paradelis) has sent to me, together with a description of it, and a sketch of its markings. It possesses a shield (somewhat like that which we publish in Photograph 3) upon which there is a letter *M* over which there is to be seen a cross. The Direction does not know where this piece was found, or when. In Rhodes there are two bronze breech-loading swivel-guns of the Archælogical Institute of the Dodecanese currently on display at the Grand Master's Palace (October 1997). One possesses a shield upon which are the letters *CO* (small *o* within a capital *C*) likewise with a cross above (the bar, however, is much longer than the vertical post) and the other bears a shield with the letters *CT*. (Various information and sketches of markings supplied to me by Anna-Maria Kasdagli, Archaeologist, Archæological Institute of the Dodecanese, 4th Ephorate of Byzantine Antiquities, Rhodes). At present I lack photographs or illustrations by which to make full comparisons of these three cannons. There are bronze breech-loading swivel-guns in Cyprus that were found in the sea (according to information furnished to me by Eftyhia Zachariou, Department of Antiquities, Nicosia, Cyprus) but of these I still know little. Swivel-guns exist in the former core areas of the Byzantine, and later Ottoman empires, as the noted pieces show. Certainly sponge divers have not devoted all examples to the scorap heap.

46) As for example to two swivel-guns of the Museo Naval of Madrid noted in José Ignacio González-Aller, *Catálogo-Guía del Museo Naval de Madrid*, Tomo I, Madrid, 1996, pp. 40 (n° 1406) and 47 (n° 1408).

47) Its number of inventory is 420.

48) Its breech-end, with its ring as it is, suggests that it is Oriental. This effect may be seen for example in five Mughul muzzle loaders in a painting of the *Bābur Nama* photographed, and serving as frontispiece, in Jean-Louis Bacqué-Grammont, *Le Livre de Babur*, Paris, 1986 (representing the Battle of Panipat, 1526), in a large Mughul muzzle loader in a painting of the *Akbar Nama* in Geeti Sen, *Paintings from the Akbar Nāma*, Calcutta, 1984, Plate 49 (representing the Siege of Chitor, 1567-68) and in illustrations of the *Bābur Nama* in G. N. Pant, *Mughal Weapons in the Babur-Nama*, Delhi, 1989, and in some exemplars. The breech-end ring also appears on 15th and early 16th century German cannons, often together with Renaissance motifs (numerous representations to this respect both in Napoléon and Colonel Favé, *Études sur le passé et l'avenir de l'artillerie*, Tomes I-III, Paris, 1846-1862 and in Erich Egg, *Der Tiroler Geschützguß 1400-1600*, Innsbruck, 1961) and the effect, I believe, was introduced into the Orient by Germans, and then passed to India by Turks and renegades. The aspect of our swivel-gun is not German, much less Venetian. The ring at the breech-end appears sometimes on 16th century Portuguese cannons. When it does, however, it appears with a lug (most often as a loop) at the upper part of the breech-end, and not at the center, as can be seen in such pieces as R.23, B.8 and in a João Vicente piece without serial number (and in several other pieces which) no longer have their breech end ring) in the Museu Militar of Lisbon, and in the Peça de Banastarim in Goa, in the Natal Museum in South Africa, in Tanger, in the Azores and elsewhere. A black and white photograph of the Peça de Banastarim, showing this effect, appears as the frontispiece of this work (Fig. 11). The position of the breech-end ring on this piece shows that it is a Portuguese cannon, and not, as is presently believed in Goa, and elsewhere, a cannon made by the Mohammedans of India during the reign of Adil Khan before the conquest of Goa by Afonso de Albuquerque in 1510. The distinguished figure of my father-in-law, Eng.° Carlos Guilherme Craveiro Lopes Couvreur (1905-1993), appears in the middle of the photograph. The photo, according to an annotation in his hand, was taken on March 24, 1954. It belongs to my wife.

49) Likewise Colonel M. Erdal Güleç (P. Kd. Alb. As. Müze ve Kült. Sit. K.) in late correspondence.

their mystery[50]. There are not many 16th century fully bronze swivel-guns of Mediterranean origin known to exist today[51]. There are many more 16th century Portuguese bronze swivel-guns which exist and are known to exist[52]. This fact is not well known.

VII.
16th CENTURY SWIVEL GUNS IN GREECE AND TURKEY INCLUDING A PIECE IN PRIVATE COLLECTION

I have recently received photographs of a bronze swivel-gun from Selçuk K. Kolay, Director of the Rahmi M. Koç Museum, in Hasköy, Istanbul (see Photographs 16 to 19)[53]. The Director informs me that the swivel-gun was found by trawlermen on the shores of the Black Sea, north of Kemerburgaz, some 15 miles to the west of the Bosphorus entrance, and that it was obtained for his private collection[54]. In its general aspect it is much like a bronze swivel-gun of the Hellenic Maritime Museum in Piraeus (see Photographs 20 and 21)[55]. It is also similar to a bronze swivel-gun of the Turkish Military Museum in Istanbul.[56]. Both the Kolay and Piraeus swivel-guns possess shields and markings of a kind. On the shield of the former are the letters *FM* over which there is a cross; on the shield of the latter is the letter *M* over which there is likewise a cross.

The initials undoubtedly represent founder's names. It is impossible for me to state, in my present want of knowledge, what they represent[57].

The three swivel-guns are, I believe, of the 16th century. They appear to me to be of Western origin but with a certain Oriental air due to their shields.

Thanks to the kindness of Anna-Maria Kasdagli (Archaeologist, Archaeological Institute of the Dodecanese, 4th Ephorate of Byzantine Antiquities, Rhodes) I have also received photographs (and sketches of markings) of two closely related bronze swivel-guns found today in the Grand Master's Palace in Rhodes (see Photographs 22 and 23)[58]. These pieces still possess bronze chambers and one of them (Photograph 22) a wrought iron wedge and the remnant of its wrought iron tiller.

The swivel-guns are Western in appearance and on their shields are letters *CT* and *CO* (small "*o*" within a capital "*C*" indicating an abbreviation) this last with a St. George style of cross above it.

Again it is impossible for me to state what names these letters represent.

In the National Historical Museum in Athens there is an early 16th century bronze breech-loading swivel-gun. It too has a shield in roughly the same position on the barrel as the above noted swivel-guns. The shield is in the form of a Valentine heart, with an antenna like symbol extending above it. Within the shield, in the upper portion of it, left to right looking at the muzzle, are the letters *I* and *B*, each within a circle, and beneath these, in the lower portion of the shield, the letter *C*[59]. (Various information, sketches of the markings and a sketch of the swivel-gun supplied to me by J. C. Mazarakis-Aeinian, Secretary General, Historical and Ethnological Society of Greece, Athens). I lack photographs of this piece.

There are iron and bronze swivel-guns in Cyprus in the castles of Limassol and Larnaka and near Paphos[60]. I lack photographs, however, by which to make comparisons[61].

As the swivel-guns presented here lack emblems indicating nationality, it appears to me that these pieces, and others like them, being found where they

50) Having established, I believe, that two of the swivel-guns are of Oriental origin, it seems to me natural to suppose, unless a proof to the contrary can be offered, that the pieces, being found where they are today, are in fact of Ottoman make.

51) Of breech-loaders I know about twenty.

52) Of breech-loaders I know about forty.

53) A first batch of photographs was sent to me for my opinion as to the date and nationality of the piece, which I gave. At my request Selçuk K. Kolay has most kindly sent to me better photographs.

54) Another swivel-gun, the Director informs me, was found in the area. Of this he has not been able to obtain any concrete information.

55) I am indebted to C. Paizis-Paradelis, Vice Admiral (Rtd), and President of the Hellenic Maritime Museum, for his intervention in securing photographs of this piece for me.

56) Inventory Number 421. See Photographs 2 and 3 in § VI, *supra*.

57) As we shall see I do have a possible clue for the Kolay piece.

58) Respectively Inventory N^{os} MB 533 and MB 534.

59) These markings are undoubtedly a craftsman's mark.

60) I am indebted to Soteris Georgallis, Press Counsellor, Cyprus High Commission, London, for helping me to secure this information.

61) I do have some sketches of markings on these pieces furnished to me by Marina Ieronymidou of the Department of Antiquities in Nicosia. The most interesting, for my purposes, are those on a bronze breech loading swivel-gun found in the castle of Limassol. These indicate that it was made by Federico Musarra in 1559. The initials on the Kolay piece fit this name.

are today, were made (at least in many cases) by Christians, or renegades, for the Ottomans working on Ottoman territory, or then by consignment[62].

Swivel-guns in the Eastern Mediterranean area are becoming better known, in such manner, that it is possible to think of groupings for them. And if the identification of the nationality of some pieces, and who founded them, remains to be established, it is at least attended with an open mind, so much as I can see. Well different is the case in Lisbon where in the Military Museum many of the 16th century Portuguese founders, of their notable collection, have been misidentified, and this for well more than one hundred years, and where in the Portuguese Academy of Antique Arms the historic "Peça de Banastarim" in Goa is considered an Islamic made cannon.

VIII.
16TH CENTURY SWIVEL GUNS IN SPAIN, GREECE, BULGARIA AND CYPRUS AND TWO BRONZE PIECES IN THE *AKBAR NĀMA*

Thanks to the kindness of José I. González-Aller, Admiral Director of the Museo Naval of Madrid, I possess photographs of a very archaic looking 16th century Portuguese bronze breech-loading swivel-gun (see Photographs 24 to 26). The Director informs me that this swivel-gun only entered the Museo Naval in 1998 and that it came from the Casa Ducal del Infantado[63]. It bears the arms of Portugal, the well known armillary sphere (but in a seldom seen form) and a much deteriorated cartouche where a founder's mark is generally found, but which is not there[64].

The swivel-gun, notwithstanding this defect, is a very interesting piece. It appears to be somewhat older than the Portuguese swivel-gun of Francisco Alvares in the British Museum[65] or that of Luis Alvares in the Deutsches Historisches Museum[66], and perhaps a good deal older than either of these pieces. I believe, in fact, that it is one of the oldest Portuguese breech-loading swivel-guns known today.

The markings on the swivel-gun are sufficiently rare. I know of only one cannon with markings that resemble those of the Madrid piece. They appear on a 16th century Portuguese bronze muzzle loader in the Museo Storico Nazionale di Artiglieria of Turin. It is still unknown in Lisbon. It is described and photographed (general view only) in *Col Ferro col Fuoco. Robe di Artiglieria nella Cittadella di Torino*[67]. The photograph is so defective, however, that the markings can not be seen. It was found in 1905 at Hafun in Italian Somaliland and is described in the cited work as *Falcone da marina, metà del XVI secolo* of Portuguese manufacture. Colonel Giuseppe Uzzo, the former Director of the Museo Storico Nazionale di Artiglieria, has furnished to me sketches of the markings. The armillary spheres on both pieces are very similar.

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Thanks to the courtesy of Mariana Krasteva, Scientific Collaborator of the Bulgarian Naval Museum, Varna, I have received photographs of a 16th century breech-loading swivel-gun with a bronze barrel and a wrought iron chamber-holder, with its tiller still in place (see Photographs 27 and 28).

Not many intact examples of this type of swivel-gun are known in artillery circles today[68].

62) During the 16th century bronze artillery, of different kinds, was widely made by Christian captives in Algiers (cf. Diego de Haedo, *Topographia, e Historia General de Argel*, Valladolid, 1612, folios 19v, 20r and 136r and v [in reality 138r and v]). Also in the *Top Hana* (cannon foundry and depot) near Constantinople by masters *di ogni nazione* (cf. Eugenio Albèri, *Relazioni degli Ambasciatori Veneti al Senato*, Serie III - Vol. I, Florence, 1840, p. 68). Also at times before a projected campaign (for example by a French renegade in 1531, at Valona, noted in Marino Sanuto, *I Diarii*, Tomo LV, Venice, 1900, Cols. 438, 442, 443, 562). There are numerous elements in the 15 volume work of Eugenio Albèri, in Serie III, Vols. 1-3, which show that Christian captives and renegades were widely used by the Ottomans in their naval preparations during the 16th century. Italians are particularly prominent (especially in the second half of the 16th century). The Kolay swivel-guns measurements are: length 1130 mm.; total length 1230 mm; bore 80 mm; diameter at mouth 150 mm. It is about the same length as one of the Rhodian pieces (MB 533), and slightly longer than the other (MB 534).

63) Its number of inventory is 6.361.

64) The Director informs me that it is 1,64 m. long with a calibre of 50 mm.

65) Cf. the study of Robert D. Smith, "A 16th century Portuguese bronze breech-loading swivel-gun", *Militaria. Revista de Cultura Militar*, n° 7, Madrid, 1995, pp. 197-205, for a description of this piece and *supra*, § III, where I identified the founder, and dated it approximately.

66) Cf. Felix von Luschan, *Die Altertümer von Benin*, Berlin and Leipzig, 1919, pp. 500, 501 and 508. This piece is well known in Germany and Spain, and photographs of it have been published a number of times. In Lisbon it is unknown, which is just as well as here it would be identified as a João Luis piece with the faulty criterion of supposing that the letter *L* moulded on it represents a last name. The *L* on it closely matches in form the *L* in the name *LVIS* moulded on the bronze muzzle loader B.8 of the Museu Militar of Lisbon.

67) Milan, 1995, p. 283. Its number of inventory is 63.

68) See Photograph 9 in § V *supra*, for an example in Istanbul. Captain A. Muhlis Ergin, Director, Turkish Naval Museum, informs me

It was found in the Black Sea near the Bulgarian coast[69].

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Thanks to the courtesy of J. C. Mazarakis-Aenian, Secretary General of the Historical and Ethnological Society of Greece, I possess slides of two 16th century bronze breech-loading swivel-guns on display in the National Historical Museum of Athens. I have had the slides developed into photographs and I present three of these in this article (see Photographs 29 to 31)[70]. The shorter of the two swivel-guns (that at the top in Photograph 29) bears a shield in the form of a craftsman's mark cut on what was moulded as shield but which is used instead, most awkwardly, as a raised surface for the mark (see Photograph 30)[71]. The longer piece also bears a moulded shield (see Photograph 31). Perhaps in former times something could be meaningfully read.

The two swivel-guns of the National Historical Museum are very close in aspect to two swivel-guns found presently in the Grand Master's Palace in Rhodes (see Photographs 22 and 23)[72]. These four swivel-guns, I believe, were made by Westerners for the Ottomans, either on Ottoman territory, or then by consignment, using common elements of a pattern (or several patterns), and probably made in fairly large numbers, but of which only a few have survived.

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In 15th and 16th century Ottoman sources *prangı* is a Turkish term for swivel-gun[73]. In the *BāburNāma* the Turki equivalent is *firingi*[74]. This of course is a well-known Oriental term for Westerner, possibly derived from the Varangian Guard of the Byzantine emperors (Barangi in Byzantine sources[75]) which was composed

that in the 19th century this piece was kept in the arms depot at St. Irene church in Istanbul before it came to the Turkish Naval Museum. I believe it is the only 16th century example of its kind to be preserved out of the sea. At present I know of eighteen existing examples of this type of swivel-gun, either retaining their iron chamber-holder (in many cases damaged or chemically transformed), or as "pipes". They bear Venetian symbols, or were found in shipwrecks of Venetian ships, or, in a few cases, are of indeterminate origin. The most pertinent of these are noted in § V, *supra* (less that which I publish in this place which was unknown to me then). This type of swivel-gun is still not very well known. How little it is known in Italy, can be seen in Grazia Musolino's "Testimonianze di relitti del XVI secolo nello Stretto di Messina" in : *VI Rassegna di Archeologia Subacquea organizzata dall'Azienda Autonoma Soggiorno e Turismo di Giardini Naxos, Giardini Naxos 25-27 ottobre 1991. Atti*, Messina, 1994, pp. 129-142 where the authoress of this article knows of only three existing examples. — The barrel of this type of swivel-gun is made by a founder, and the chamber-holder by a blacksmith, and it is never really possible to know (by any human means) who made the cannon.

69) My contact informs me that this piece was recovered *de la mer Noire près des côtes bulgares pendant un dragage* and that it has been in the Bulgarian Naval Museum for more than 10 years.

70) These two swivel-guns, the Secretary General informs me, were donated by the Military School to the Historical and Ethnological Society in 1927. They were found, he informs me, in the port of the fortress of Nafpaktos (Lepanto) and are 1,12 and 1,25 m. long. Unfortunately I do not know when they were found, or anything concrete to this respect. They are fairly well known in Athens due to published guides (a brief notice in the Society's English guide *The National Historical Museum*, Athens, 1994, p. 19) and because they are exhibited.

71) It is impossible for me to state, in my present want of knowledge, what the letters of this mark represent.

72) I am informed by Anna-Maria Kasdagli, Archaeologist, Archaeological Institute of the Dodecanese, 4th Ephorate of Byzantine Antiquities, Rhodes, that these two swivel-guns have been in Rhodes since before World War II and that it is believed in archaeological circles in the Dodecanese that they were found during the Italian period (1912-1947) in what was formerly the area of the arsenal of the Knights (later of the Turks) in the Collachium of Rhodes. They were guarded for many years on the ground floor of the New Hospital of the Knights, today, and since 1914, the Archaeological Museum of Rhodes, in circumstances, I believe according to the elements that I have been able to secure, in which they were little accessible to the public.

73) For some basic elements see Halil İnalcık "The Socio-Political Effects of the Diffusion of Fire-arms in the Middle East" in : V. J. Parry and M. E. Yapp (editors), *War, Technology and Society in the Middle East*, London, 1975, pp. 195-217 (especially p. 215), Michel Lesure "Un document ottoman de 1525 sur l'Inde portugaise et les pays de la Mer Rouge", *Mare Luso-Indicum*, Tome III, Paris, 1976, pp. 137-160 (especially p. 153) and Henry and Renée Kahane and Andreas Tietze, *The Lingua Franca in the Levant. Turkish Nautical Terms of Italian and Greek Origin*, Urbana, 1958, pp. 122 and 123 (I am indebted to Jean-Louis Bacqué-Grammont for furnisihing to me the elements on *prangı*, and similar, found in this source). The work of Jean-Louis Bacqué-Grammont and Anne Kroell, *Mamlouks Ottomans et Portugais en Mer Rouge. L'affaire de Djedda en 1517*, Cairo, 1988 is also very instructive to this respect because it compares the listing of cannons in the cited document of Michel Lesure with contemporary (or near contemporary) Portuguese and other European sources citing cannons used at the time of Ra'îs Salmân's Yemen expedition of 1515-1517 (see especially his foldout chart in their work) and it is evident that *prangı* in Turkish, in this instance, is equivalent to *berço* in Portuguese i.e. to what today is called in English a breech-loading swivel-gun.

74) Several *firingi* appear to have been used at the Battle of Panipat in 1526. See *The Bābur-nāma in English (Memoirs of Bābur)*, Translation of Annette Susannah Beveridge, Vol. II, London, 1922, pp. 473, 474.

75) The office is referred to often in a mid 14th century work, formerly thought to have been written by George Codinus, on Byzantine court and ecclesiastical offices, officials and ceremonies (cf. George Codinus, *De Officialibus Palatii Cpolitani et de Officiis Magnæ Ecclesiæ Liber*, Bonn, 1839 in the series *Corpus Scriptorum Historiæ Byzantinæ*), and noted (in the same well indexed series) in the histo-

of Westerners[76]. Curiously this might help to explain why today so many swivel-guns found in Turkey, Greece and Cyprus are Western made, but without national markings, that is they were made on wide scale by Westerners for ruling elements within the Ottoman Empire.

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As I noted *supra*, § VII, footnote 61, there is a bronze breech-loading swivel-gun in the castle of Limassol in Cyprus made by Federico Musarra dated 1559. Thanks to the intervention of Soteris Georgallis, Press Counsellor, Cyprus High Commission, London (to whom I heartily express my thanks) I am able to present a photograph of this piece furnished to me by the Department of Antiquities in Nicosia (see Photograph 32)[77]. It is the only 16th century breech-loading swivel-gun that I know with both a founder's name (or mark) and a date on it. It is a notable piece of its kind[78].

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I do not know of any existing example of a Mughul 16th century bronze breech-loading swivel-gun. In the Victoria and Albert Museum's 16th century illustrated version of the *Akbar Nāma* there is a miniature that shows two Mughul breech-loaders of this variety being used at the Siege of Chitor in 1567-68 (I.S. 2-1896, 69/117). I reproduce both pieces as an inset to Photograph 29[79]. As this illustrated manuscript has been generally dated about 1590[80], and more recently by a few years earlier[81], the painting should portray with accuracy, I suppose, the use and form of Mughul cannons at the time of that siege[82].

Mughul artillery was much influenced by Ottoman influences throughout most of the 16th century[83]. By the second half of the century it had developed its own forms, to judge by the miniatures of the *Bābur* and *Akbar Nāma*.

R. B. S.

rical works of John Scylitzes (11th century), Michael Attaliates (11th century), Nicetas Choniates (12th/13th centuries), John Cantacuzene (14th century) and in many other Byzantine sources. I do not know when this office, with this name, disappeared among the Byzantines. In the 15th century history of Ducas (Ducæ Michaelis Ducæ Nepotis, *Historia Byzantina*, Bonn, 1834 [Chapter 28, p. 185] in the cited series *Corpus Scriptorum Historiæ Byzantinæ)* the guards of Manuel II Palæologus in 1422 are noted as Cretans, without the appellation Barangi or similar. The term Barangi was probably well known to the invading Turks of Anatolia, especially after the Battle of Manzikert (1071).

76) Many references in the article of Gottlieb Siegfried Bayer "De Varagis", *Commentarii Academiæ Scientiarum Imperialis Petropolitanæ*, Tomus IV, St. Petersburg, 1735, pp. 275-311 and in the commentary of Johann Jacob Reiske in Constantine Porphyrogenitus, *De Cerimoniis Aulæ Byzantinæ*, Vol. II, Bonn, 1830, pp. 474-476 (in the series *Corpus Scriptorum Historiæ Byzantinæ*).

77) I furnish the readings that appear in Photograph 9 on the basis of drawings and unsatisfactory slides furnished to me by the Department of Antiquities. The date is moulded in a seldom seen combination of numerals near the muzzle and the founder's credit is moulded in Roman capital letters near the front of the breech. The swivel-gun is located today in the Medieval Museum of Cyprus in the castle of Limassol. According to information furnished to me by the Department of Antiquities (in the person of Marina Solomidou-Ieronymidou) the swivel-gun was "illegally" removed from the sea bed near Kouklia, at Ahni, in the Paphos District, and was confiscated by the government in the 1985-86 period.

78) I know very little about Federico Musarra. He is undoubtedly Italian, perhaps from what was formerly called the Kingdom of the Two Sicilies. There is no entry for him in Enzio Malatesta, *op. cit.* (among the numerous Italian cannon founders noted in this guide) and he seems to be as little known in Italy as without. A very succinct entry in the manual of A. N. Kennard, *op. cit.*, p. 118.

79) On basis of the miniature published in Geeti Sen, *Paintings from the Akbar Nama*, Calcutta, 1984, Plate 49.

80) Since the publication of Robert Skelton's "Two Mughal Lion Hunts", *Victoria and Albert Museum Yearbook*, n° 1, London, 1969, pp. 33-48 (cf. p. 38).

81) As early as 1586-87 in John Seyller's "Codicological Aspects of the Victoria and Albert Museum *Akbarnāma* and their Historical Implications", *Art Journal*, Vol. 49, n° 4, New York, 1990, pp. 379-387. About 1590 or earlier in Milo Cleveland Beach, *Early Mughal Painting*, Cambridge, Mass. and London, 1987, pp. 111-128. A few years before 1590 in his *Mughal and Rajput Painting* (in the New Cambridge History of India series), Cambridge, 1992, pp. 62-67.

82) This painting is well known in Oriental art circles and appears, for example, in Ivan Stchoukine's *La peinture indienne à l'époque des Grands Moghols*, Paris, 1929, Plate XII, in Mario Bussagli's *Indian Miniatures*, London, 1969 (translated from the original Italian edition of 1966), Plate 22 and in Rumer Godden's *Gulbadan. Portrait of a Rose Princess at the Mughal Court*, London, 1980, p. 119.

83) The works of Paul Horn, *Des Heer- und Kriegswesen der Grossmoghuls*, Leiden, 1894 and William Irvine, *The Army of the Indian Moghuls: Its Organization and Administration*, London, 1903, give abundant testimony of this fact.
Not all the miniatures of the Victoria and Albert Museum's illustrated *Akbar Nāma* are published. I am indebted to Divia Patel, Curatorial Assistant, Indian and South-East Asian Department, Victoria and Albert Museum, for help in searching for cannons in the unpublished miniatures of this manuscript. Also to Ellen Smart in San Diego who has kindly searched her slides of this manuscript to this end. Thus I believe I can say with assurance that the miniature that I publish in Photograph 6 (detail) is the only miniature of the Museum's *Akbar Nāma* containing bronze breech-loading swivel-guns. There are no bronze breech-loaders in any of the 16th century illustrated versions of the *Babur Nama*, as far as I have been able to ascertain, and this with help of Ellen Smart, who knows this material better than any other person. There are many dispersed miniatures of the *Bābur Nāma*, some of which are unknown, others have disappeared altogether. The case is the same with the *Akbar Nāma*, but to a much lesser extent. The number of unpublished Mughul miniatures is extensive and something more perhaps awaits to be discovered in this context. Several iron breech-loading swivel-guns in a painting of the Siege of Ranthambhor of 1569 in the Victoria and Albert Museum's *Akbar Nāma* (74/117) can be seen in Geeti Sen, *Paintings from the Akbar Nāma*, Calcutta, 1984, Plate 54.

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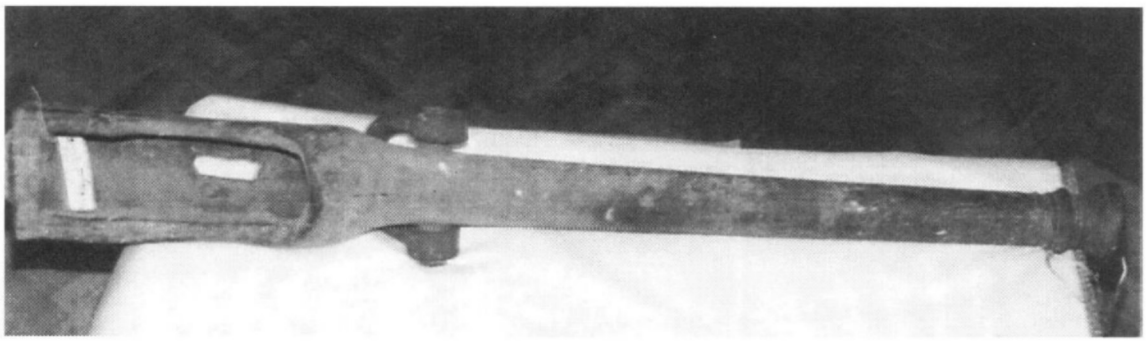

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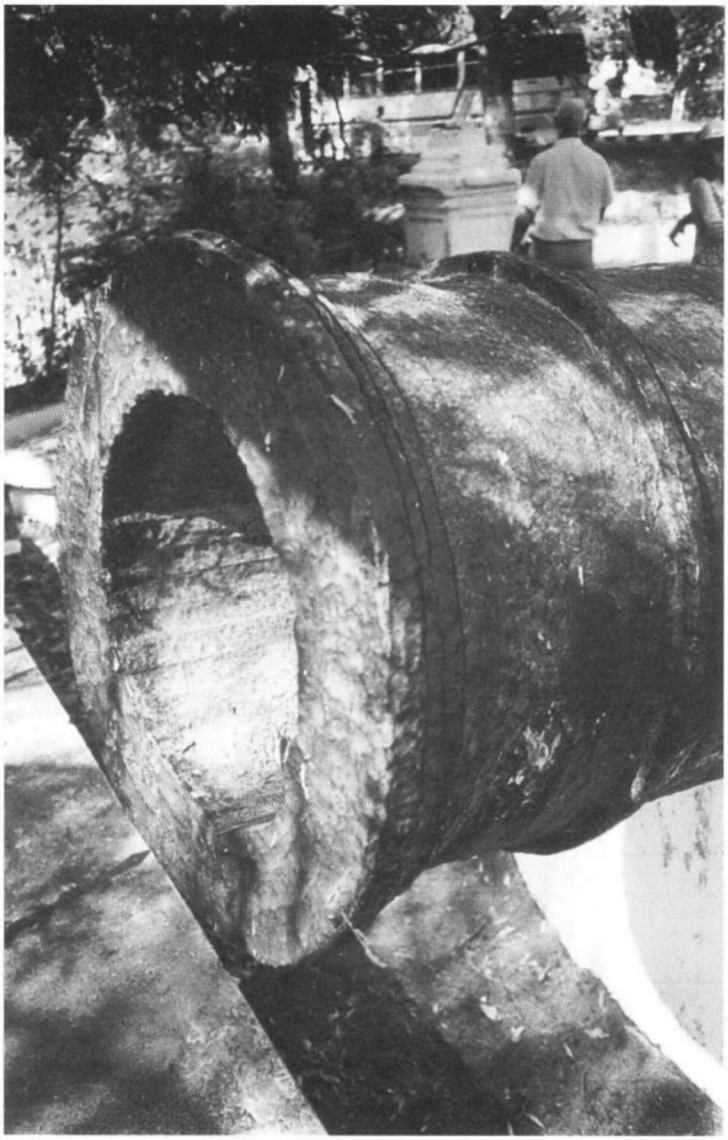

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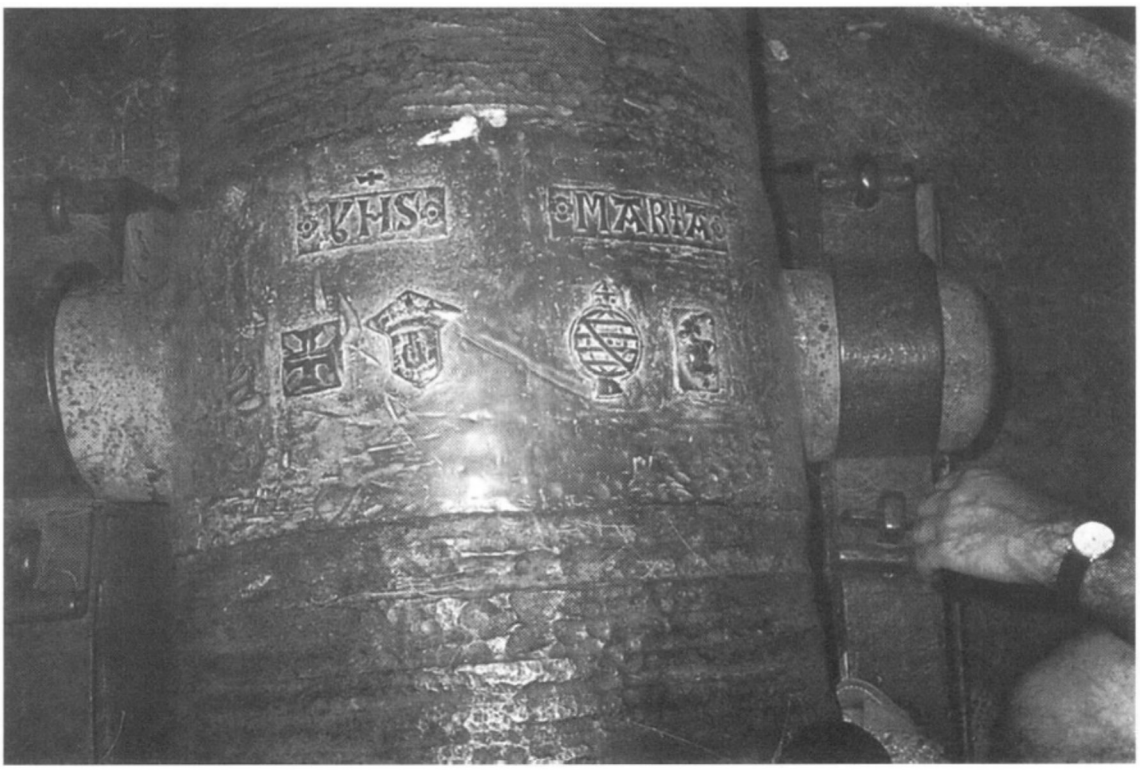

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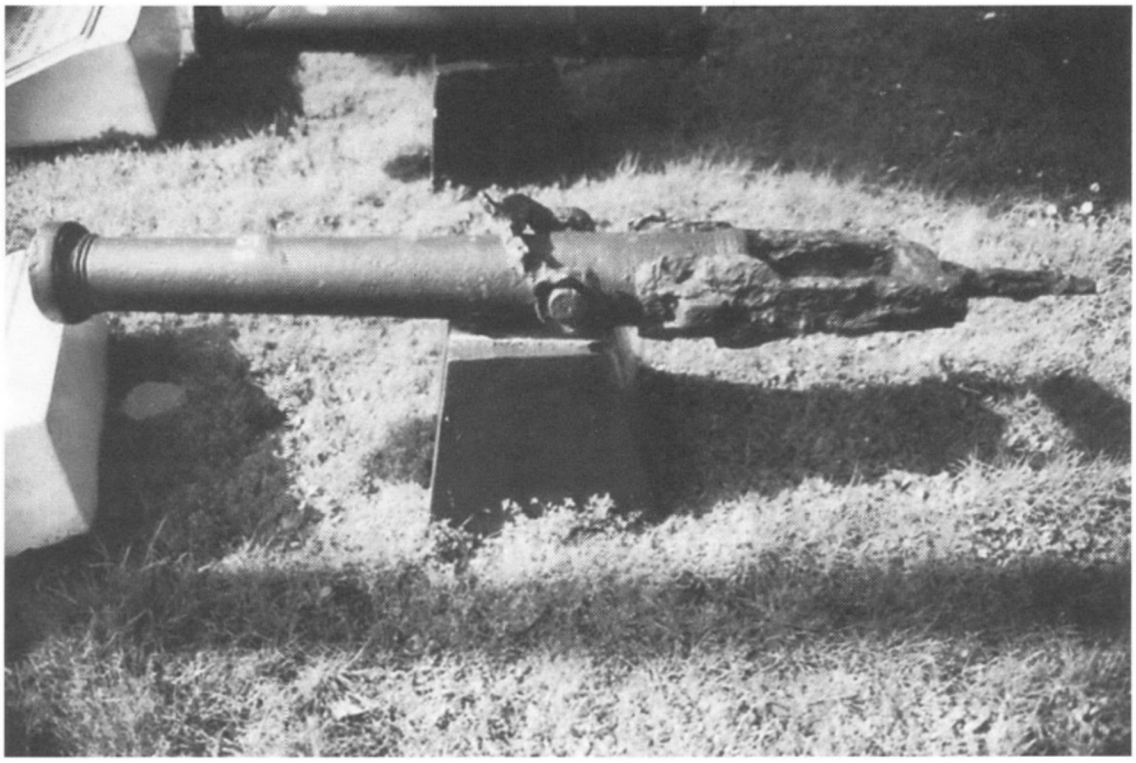

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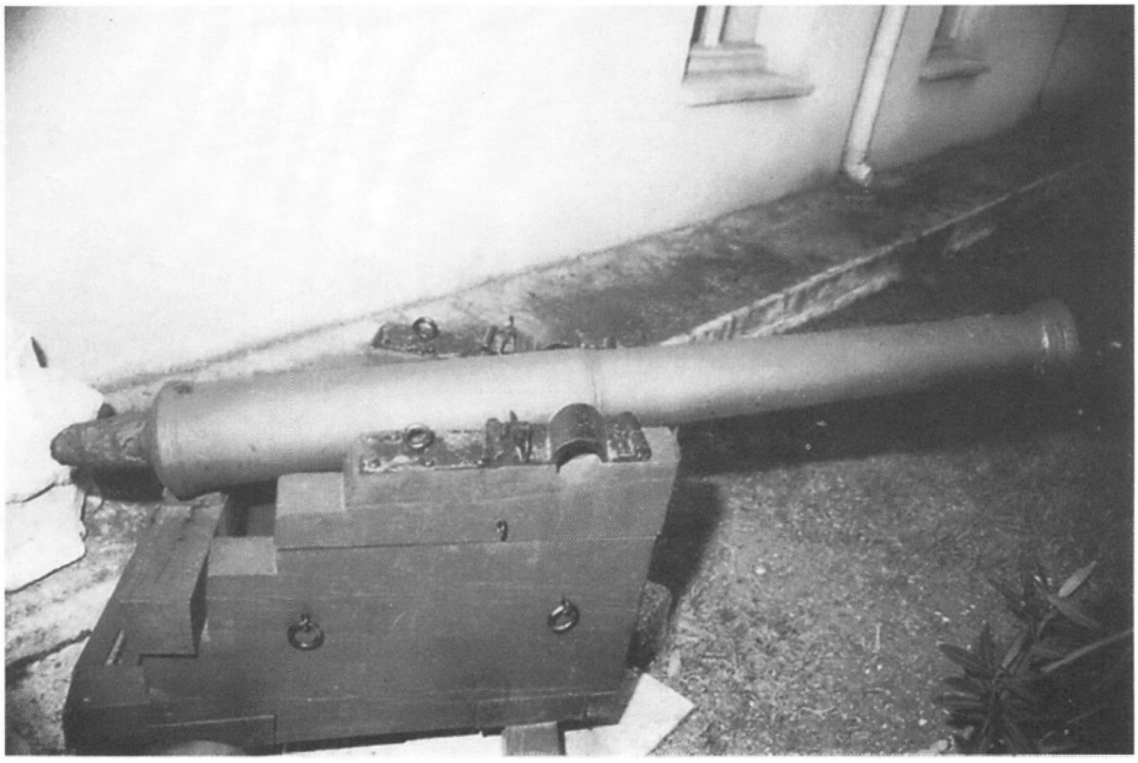

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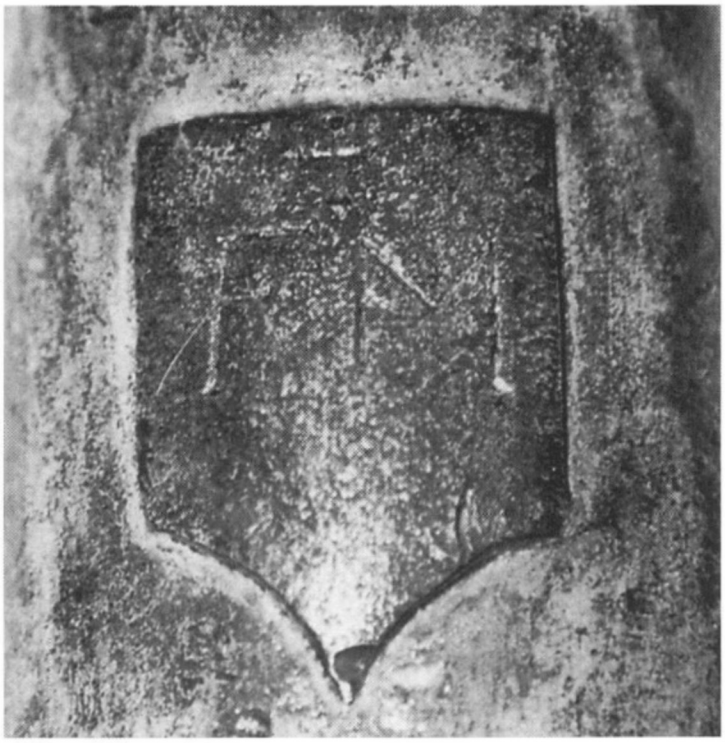

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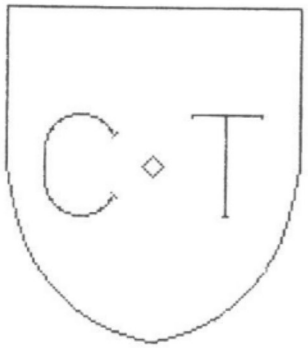

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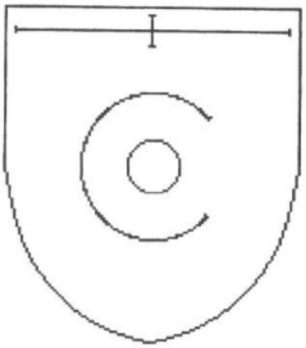

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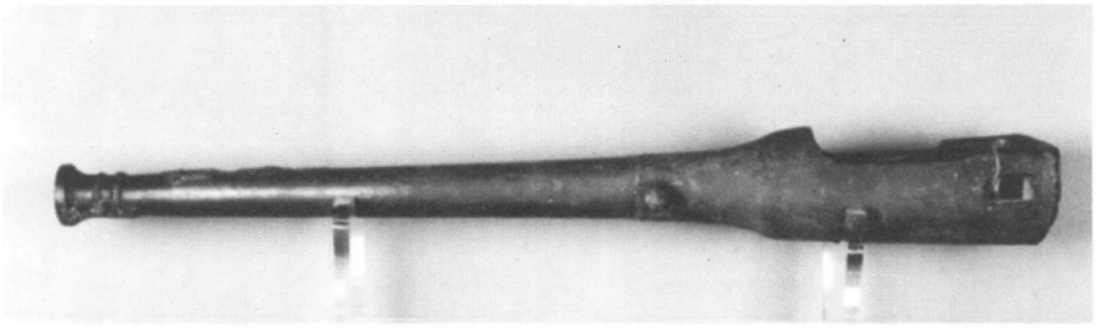

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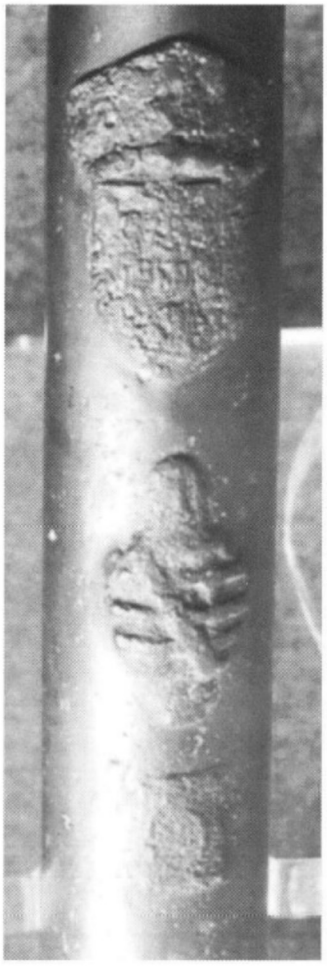

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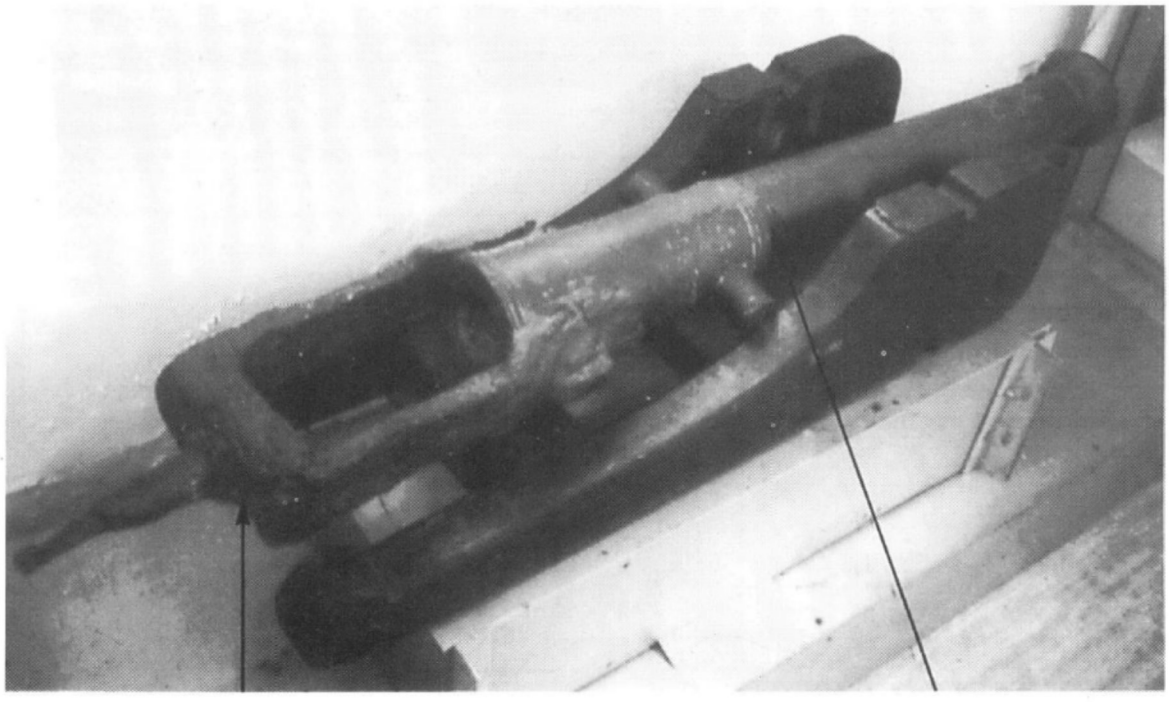

Fer (iron) Bronze

Photograph 27. Fer (iron) Bronze

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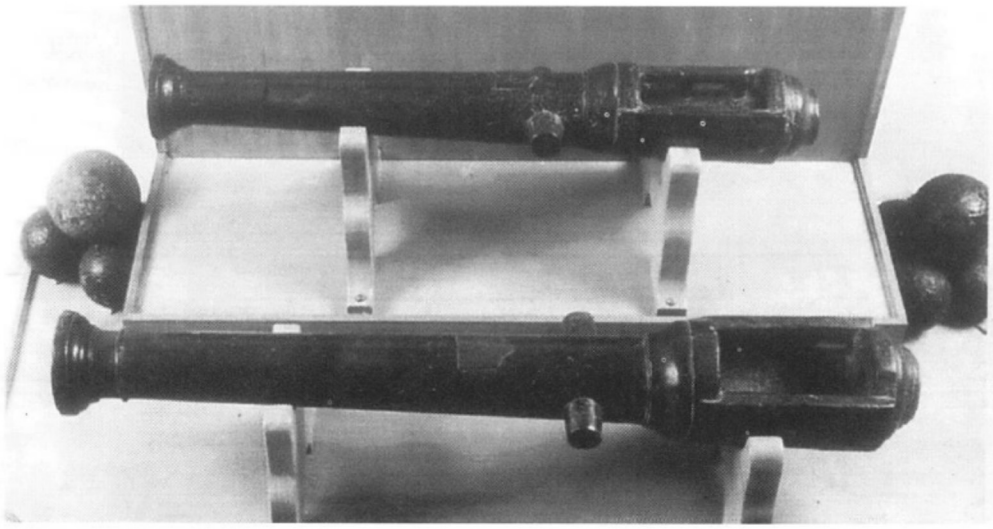

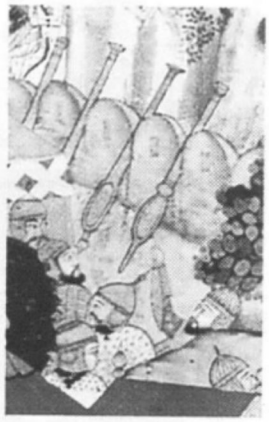

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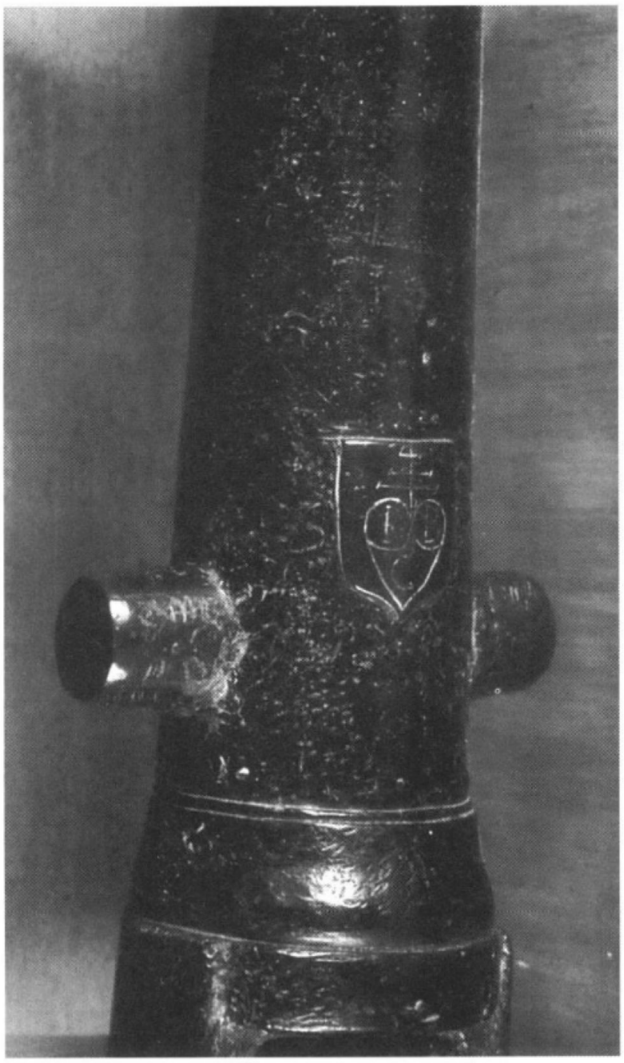

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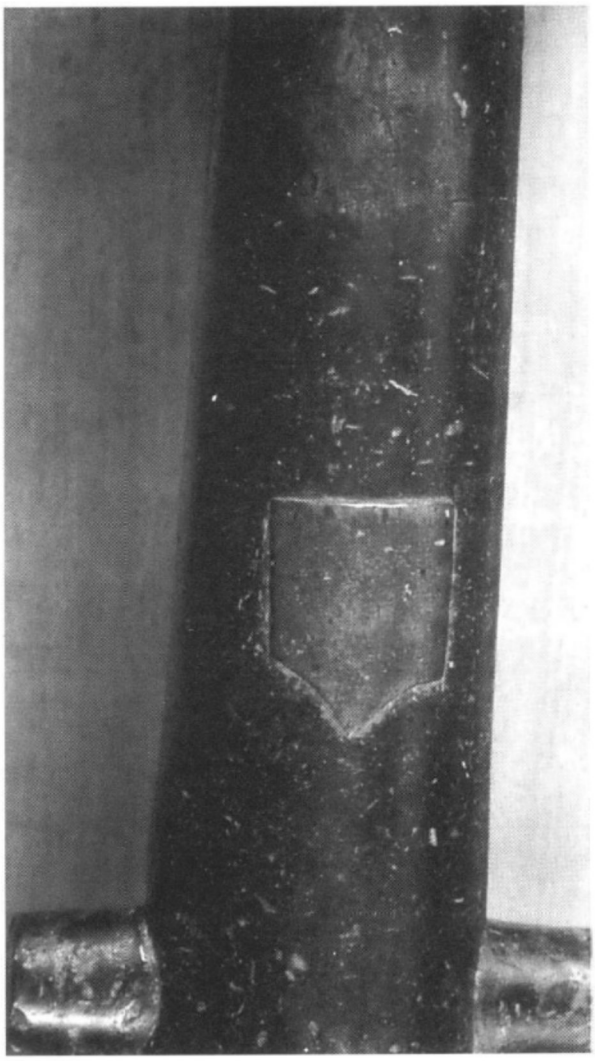

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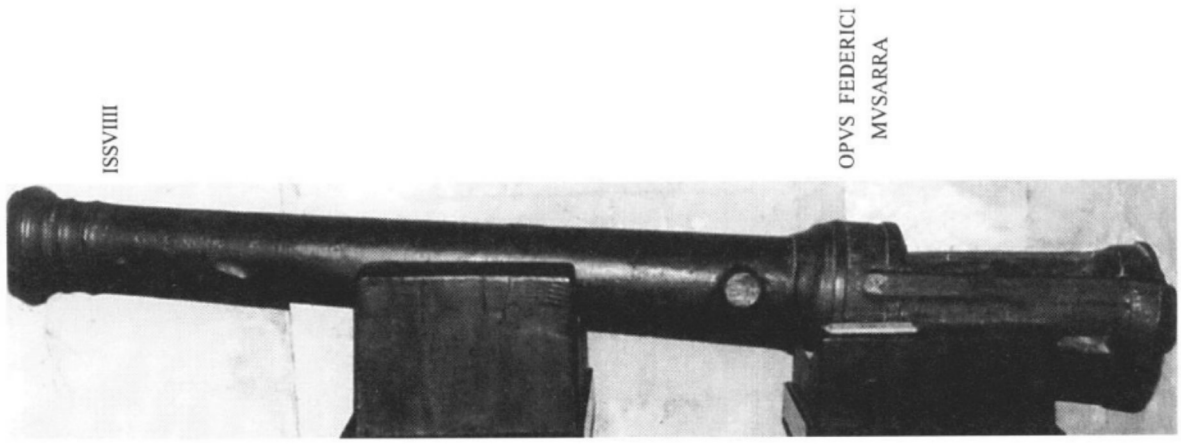

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